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West Europe Report

SCIENCE AND TECHNOLOGY

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COMPUTERS

NIXDORF OF FRG EXPLAINS STRATEGY FOR EXPERT SYSTEMS

Duesseldorf VDI NACHRICHTEN in German 15 Mar 85 p 17

[Article by W. Mock, under the rubric "Data Processing": "Expert Systems: Application Possibilities Are Unlimited; In Addition to Developing Traditional System Families, Computer Manufacturers Are Betting on Future Technologies"]

> [Excerpts] The age of information processing seems to have already passed its peak. What is coming is knowledge processing, also called artificial intelligence (KI [German] or AI [English]). Worldwide research in this field is in full swing. In the Federal Republic of Germany, Nixdorf is pushing the development of artificial intelligence with the development of expert systems aimed at imitating human intelligence by machine.

Nixdorf Computer AG, as Stuart Savory, the Nixdorf project manager for artificial intelligence and expert systems, said at a Nixdorf press seminar from 20 to 22 February in Spitzingsee, is in the lead on an international scale in developing this new application field of data processing. The company is focusing primarily, however, on a branch of artificial intelligence which promises relatively fast translation into industrial practice and thereby economic profit: expert systems.

The TWAICE [True Wisdom Artificial Intelligence and Computerized Expertise] expert system offered by Nixdorf has a software package written in Prolog which should be applicable to any area of knowledge. The knowledge base is gathered from experts and connected to TWAICE by an interactive interface.

Since artificial intelligence and its industrial use in the Federal Republic of Germany is still in its infancy, Nixdorf also offers a number of related services: These range from cost-benefit analysis for the introduction of an expert system through its machine installation to training of future operating personnel. Such a package could hardly be inexpensive and ranges from 150,000 to 200,000 DM. To start, TWAICE will probably be tailored primarily to the interests of Nixdorf's traditional large customers: banks, insurance companies and possibly the chemical industry as well.

While earlier expert systems could be developed and installed often only on large computers, the Nixdorf system has the advantage of the capability of operating on conventional minicomputers at the high end of the performance scale. Thus, the Nixdorf expert system requires no special computer for artificial intelligence. With that, according to Savory, the company is keeping to its strategy of bringing computer service, in the form of expert systems in this case, to medium-size companies as well. Whether these medium-size enterprises can also afford such a system will be established by the decisive exhibition of TWAICE at the Hannover Fair.

With this expert system, the first steps have also been taken in the direction of new promising markets; thus, at the current time Nixdorf's large business --sales increased from 2.7 billion in 1983 to almost 3.3 billion DM in 1984-- still comes also from the "traditional" information processing and communication systems. Thus, Klaus Luft, Nixdorf's deputy chairman of the board, described the 8864 and 8870 system families as the basis of Nixdorf's growth. At the same time, he pointed out that for Nixdorf, 1984 was the year of the point-of-sale (POS) system (computer cash registers), and further increases in POS system sales are also expected in the coming years.

Nixdorf's competitive strength has primarily been in the distinctive user and service orientation of the company as well as in the broad software supply and trade specialization. As Luft said further, the capability of computer manufacturers to compete in future will depend essentially on how successfully the companies integrate computer, office and communication technology. Consequently, Nixdorf will be continually expanding the product supply in this area; the aim is to offer complete systems for office automation. In this connection, Luft named the impending release of a digital telephone system which also allows transmission and reception of data, text and graphics in addition to the telephone functions in connection with digital private branch exchange [PBX] systems.

At the coming Hannover fair, Nixdorf will display a number of performance expansions for existing standard workplaces and several new workplace systems. This includes IBM-compatible personal computers in the 8810 series and multifunctional professional work stations. With the 8810/25 personal computer now announced, Nixdorf offers an IBM PC/XT compatible line which covers the entire PC applications spectrum. While the 8810/25 CPC (compact personal computer) is intended to meet the requirements of an individual work place, the 8810/65 SPC runs under Concurrent DOS, a multitasking operating system. Window technology enables user interaction between applications running at the same time.

Nixdorf implemented a new technological aspect with the development of a professional workstation (PWS) which both ensures integration into the Nixdorf product families and makes PC functions accessible at the work place. Nixdorf has paid special attention to the ergonomics in addition to the technical performance of this new workstation system. Among the performance features of the professional workstation, which is already being delivered, are a nonflickering positive display screen which also allows color representations

and Btx-Teletex compatibility, window technology with up to eight different windows, pick/put functions and file transfer.

Nixdorf will present its new developments in communication technology in Hannover as another building block for office automation. The replacement for the 8818 digital private branch exchange [PBX] announced already in 1983 is the Digifon digital telephone system which has now been introduced into the market. This system already allows simultaneous use of voice and data communication today in the in-house area the and contains all options for future connection to the planned ISDN network.

Nixdorf is also expanding the spectrum of its microcomputer systems, the concept of which is aimed at also making available a broad supply of applications and systems software for smaller systems. With that, both a new user group in the area of medium-sized enterprises is being approached and large enterprises are being offered microcomputer families graduated in performance, yet compatible for tying together into networks.

8545
CSO: 3698/511

COMPUTERS

DETAILS ON LANGUAGE USED BY 'MAIA,' FRENCH AI MACHINE

Paris ELECTRONIQUE ACTUALITES in French 1 Apr 85 p 8

[Article by Pierre Vandeginste: "MAIA, a Trump for a French Fifth Generation"]

[Excerpts] France also is not just discovering AI [artificial intelligence]. The lack of a national program has not kept several teams from producing results which, in some cases, we can be envied. In the Hexagon [metropolitan France] we have even built the prototype of an MAIA [Machine for the Applications of Artificial Intelligence] which can be compared, without blushing, to the PSI computer, which is the first step, from the standpoint of hardware, toward the Japanese fifth-generation computer.

High Degree of Parallelism

The latter, we are told, will be characterized by a high degree of parallelism, of multiple processors operating jointly to attain the goal of 1 GLIPS [billion logical inferences per second] by lumping together all the "rules" applicable to the problem being addressed in a mammoth "knowledge base." But the experts of the CNET-Lannion [National Center for Telecommunications Studies-Lannion] like those of the CGE's [General Electric Company('s)] Marcoussis Laboratories know as well as the Japanese that many problems--some of a theoretical order-- have yet to be resolved before that point can be reached. This is why MAIA, like PSI, are single-processor computers.

A 'Software Layer'

Interpretation, in conferring on LISP a highly dynamic character, is not lacking in advantages, but the other side of this coin is the slow speed of execution, owing to the existence of this intermediate "software layer" between a conventional computer and its programs. These considerations led MIT's [Massachusetts Institute of Technology('s)] researchers to conceive a "language machine" designed for LISP, that is, a computer whose machine language was the internal representation of LISP. This approach was rendered feasible by the rapid advance of the microprogramming principle, invented in 1951 and already in widespread use. CADR, the first LISP machine, was thus the result of incorporating a LISP interpreter, translated into microinstructions, into a Burroughs B1700 modified for the purpose.

The LISP machines offered by LMI and Symbolics were derived from these research efforts, and were later joined by Xerox's products and, more recently, Texas Instruments's Explorer. MAIA, of course, borrows many of the concepts used in these computers. However, it departs somewhat along different lines at certain points. According to Jean-Paul Sansonnet, for example, who heads the project at CGE, the intent was not to make MAIA a LISP machine, but rather a sort of "lists machine," that is, an architecture suited to the processing of lists, which are the basis of all AI programs, whether they be written in LISP or in Prolog--the two languages adopted for the project--or in any other language.

Another important point, according to Jean-Paul Sansonnet, is that MAIA makes use of a new "executive system," which differs quite sharply from those used to date on LISP machines. The latter, as we have seen, perform LISP operations directly, through a microprogrammed interpreter: A "direct executive system." True, "microinterpretation" makes possible the attainment of higher performances than interpretive programming. However, research done at MIT and Xerox showed that it was possible to combine LISP with compilation. Although the possibility of being able to dynamically execute a list produced in the course of execution is an important characteristic of LISP, there is nothing to prevent compiling the others, those that constitute the LISP "program," before the launching of the execution.

Thus, MAIA's is a "semidirect executive system." The source text of the programs written in LISP or Prolog is translated by a compiler into an intermediate language called LEM, which is based on a set of some 50 instructions. These instructions are arranged in a fixed 40-bit format, an unusual length that is very easily explained. MAIA is in effect a 40-bit-word machine in which 8 bits are used to form a tag field permitting, in particular, the dynamic differentiation, at the hardware level, of LISP and Prolog objects of various types (indicators, entities, floaters, character strings, etc.) coded using the remaining 32 bits. This characteristic specifically enables MAIA to address directly a virtual memory of 4 billion words, that is, some 20 billion 8-bit-bytes. Not bad, from the standpoint of implementing lists...

A 'Symbolic Piggyback'

And perhaps the most important point, according to Jean-Paul Sansonnet, is that MAIA will be not just a work station for the development of AI applications but, foremostly, a "symbolic piggyback," that is to say, a special-purpose list-processor designed to be integrated into an operational data-processing system. The applications being accorded the highest priority are those connected with production: Robotics, flexible workshops, and process control, for example. With this in mind, choices have been governed by "real-time orientations" (the multitask executive system is based on the Sceptre real-time processing system) and the standard VME [virtual memory environment] bus was chosen as the interface with the outside world.

Two operational, although incomplete, prototypes are already operating, and mock-ups of the principal software packages, and particularly of the LISP and Prolog environments (Common LISP and Maialog, to be exact), have, according to the prime contractors, already yielded very encouraging performance measurements and enabled validation of architectural choices. In any case, these results show that the French enterprises can perfectly well find within the Hexagon the necessary expertise to carry out successfully an ambitious AI project.

A number of accomplishments, like this one, provide a combined indication that our country has at its disposal an intellectual potential enabling it to take a leading position in the AI race. This, however, will require that research and, above all, industry not take to the field in extended order towards objectives too many in number and too ill-defined. Still being awaited is a "Program for French Artificial Intelligence."

9399
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COMPUTERS

DASSAULT OF FRANCE WANTS ITS CAD/CAM SYSTEM TO BE IBM STANDARD

Paris ELECTRONIQUE INDUSTRIELLE in French 1 Apr 85 pp 43-44

[Article by Laurence Renoux]

[Text] One can hardly be expected to know that CATIA, the CAD/CAM [computer-aided design, computer-aided manufacturing] software developed by Dassault Systemes and commercialized by IBM was born of aeronautics. This is not at all surprising when one considers its creator. Be that as it may, it is used by almost 80 percent of the builders of planes and helicopters throughout the world. However, after 4 years of existence, CATIA has greatly diversified its centers of interest, and the automotive sector today represents 30 percent of its market (BMW, Audi, Renault, General Motors, American Motors, etc), whereas aeronautics has dropped to 25 percent.

Nevertheless, Dassault Systemes is far from wanting to stop there. Its desire is, in fact, to see CATIA become, in due time, IBM's standard CAD/CAM system. At present, IBM markets several CAD/CAM systems suited to different applications, including CADAM, developed by Cadam Inc. (an offspring of Lockheed). Last year, four CADAM software packages were sold for every CATIA. Dassault Systemes's objective is to attain a 1 for 1 ratio by 1987.

To this end, several modifications have been made that have led to a new version, "CATIA Version 2 Release 2," which is fully compatible with its predecessor (Release 1).

At the work station level (IBM 5080), local transformations have been extended to the 3D. The arithmetic and logic operations followed by the protections are thus executed in real time, without loading the computer. It is recalled that Dassault Systemes handles software modifications. Everything concerning the hardware is done by IBM.

This version also embodies two new modules. The first is an interactive graphic interface enabling the user to write specific applications such as, for example, the definition of parametered pieces. The second is a building-application module that was developed jointly with Bouygues, where it is already in service.

Another major modification concerns the data-base interfaces. In this domain, things are beginning, little by little, to standardize, and there are

presently two standards: IGES [Initial Graphics Exchange Specification] and SET [Exchange and Transfer Standard]. It is highly possible that both these proposed standards will eventually lead to a single one, and Dassault therefore settled on both. Thus, CATIA will have an IGES interface and an SET interface.

These developments, which will become available around mid-1985, are being accompanied by longer-term announcements. CATIA exists at present in its mainframe version (43XX Megamini and IBM 3091 Computer) controlled by MVS or VM operating systems, at a price of 800,000 to 1 million francs. This positions this software among "very" top-of-the-line systems. In announcing a 32-bit, stand-alone, UNIX-controlled configuration, for 1984, Dassault will be offering a system which, it claims, will not have lost any of its functional qualities, and at a price of 400,000 to 600,000 francs. Moreover, although targeted for 1985 (see ELECTRONIQUE INDUSTRIELLE No. 68 p 33), the PC version will also be out in 1986. Based on IBM's PC-XT, and consequently controlled by DOS operating systems, this version will include two tow modules--one for design-drawing applications, and the other for 2D numerical control applications--at a cost of 150,000 to 250,000 francs.

The year 1986 will also see the integration of a structural computations software, and of a relational data base support, an extension of DB2 and SQL. Presently, more than 200 installations are equipped with CATIA (by installation we mean a computer equipped with seven work stations, on average), a figure that Dassault fully expects to double this year, and that would bring its revenues up to around 100 MF [million francs], or about 100 percent up over 1984 (58.5 MF), representing an increase that is all the more significant in that Dassault furnishes nothing more than "gray matter," with no raw materials involved, and in that CATIA systems are not sold but rather leased on a monthly basis. On the other hand, CATIA seems to be well entrenched in the international market. In fact, 50 percent of its installations are made in North America; 30 percent in Europe, with only 10 percent in France; and 20 percent in the Far East (Korea, Taiwan, Indonesia, China, etc.). However, Dassault recognizes that its success, particularly in the United States, is owing principally to CATIA's image as an "IBM product."

Be that as it may, it is well within the realm of probabilities that CATIA will become one of the world's key softwares in the CAD/CAM market, but also in the IBM catalog. For, in offering a line of products (mainframe, stand-alone, and PC versions) that are compatible and interconnectable, and in increasing the number and types of interfaces (IGES and SET interfaces, interactive interface for applications development, interfaces with other systems, etc.), CATIA becomes an "open-ended" product suited to a wider range of users.

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BIOTECHNOLOGY

BRIEFS

INSERM ROUSSEL-UCLAF AGREEMENT--Paris--INSERM (National Institute for Health and Medical Research) and Roussel-Uclaf will collaborate in research areas covering drugs and biotechnologies: a framework agreement was signed by the two partners on 25 February in Paris. Philippe Lazar, general director of INSERM, and Edouard Sakiz, president of Roussel-Uclaf's board of directors, stated in a communique that the operation could take the form of collaborations on scientific programs, research services at the request of one of the partners, product or technology transfers, personnel training, or information sharing. This agreement is based on the experience of several long-standing collaborations, organizes the mutuality of exchanges and communications, and defines a general philosophy as well as the basic clauses for collaboration between the two organizations, so as to open a reference contractual framework for all new operations, and to accelerate the implementation of future cooperative work. Roussel-Uclaf will thus be able to use the results obtained, by paying royalties to INSERM, and "researchers participating in the development of inventions will be mentioned as inventors," adds the communique. [Text] [Paris AFP SCIENCES in French 28 Feb 85 p 64] 11,023

CSO: 3698/513

FACTORY AUTOMATION

FINANCIAL STATUS OF RENAULT AUTOMATION IN 1984

Paris AFP SCIENCES in French 10 Jan 85 pp 38-39

[Article: "Renault Automation: Operating Balance in 1984"]

[Text] Operating expenses of the Renault Automation division of the nationalized French automobile firm were probably balanced in 1984 and the division is counting on robotics in particular in 1985 and 1986, as indicated by the president, Adrian Bertetto, on 9 January.

Since 1984 the automation division has included all the companies and activities of the firm in the area of automatic devices and robotics. Bertetto, who visited the division's "Acma Robotics" factory in Saint-Ouen l'Aumone (Val-d'Oise), stated that assistance given by the firm and by the government within the framework of the modern production techniques plan (45 million francs) enabled research and development to be doubled (100 million francs in 1984) while operating expenses still remained balanced.

Continuation of this plan should allow R&D to reach 140 million francs while maintaining the balance in 1985 and 1986. The company will then provide its own financing through a complete line of products in the area of automation.

Sales of this branch will be the major moving force behind development in 1985 with 816 million francs, of which 63 percent will be outside the Renault conglomerate, compared to 565 million with 46 percent outside the group in 1984. Production of robots could climb from 170 units in 1984 to 400 in 1985. However, machine-tool and engineering activity should remain the same and total turnover should go from 1.8 billion in 1984 to 1.9 billion francs in 1985.

Renault Automation signed several cooperation agreements in 1984 to develop its industrial and commercial potential in the area of automatic devices, notably with Matra for computer-assisted design, with Merlin-Gerin for programmable robots, with the American firm Coherent for lasers and lastly with the Japanese firm Toyoda for small robots.

This last agreement should result in the sale of 10 to 20 robots in 1985 and twice that in 1986 according to Bertetto. In addition, Renault hopes this year to develop a method of transporting spare parts in the factories using "wire-guided carts" (controlled by computer from cables hidden in the floor).

There should be fewer cooperation agreements in 1985; however, a reliable source has said that discussions are under way with the American firm Federal for marketing measuring machines in both France and the United States.

Finally, Renault Automation has indicated that the factory opened in Denain as the result of an "intense appeal by the public authorities" will create 150 to 200 jobs. In addition, the firm might be able to participate in a possible resumption of the automatic device activity of H. Ernault-Somua (HES) in cooperation with the Japanese firm Toyoda.

9720
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PILOT PLANT FOR AUTOMATED PRODUCTION OF VW GEAR PARTS

Landsberg MODERNE FERTIGUNG in German Mar 85 pp 14, 16, 18, 21

[Article: "CNC in Mass Production: Using Cannons Against Sparrows?"]

> [Text] As before, the greatest reserves for rationalization are in the assembly area. But the pilot project for the manufacture of planetary wheels at the transmission plant of the Volkswagen auto concern in Kassel shows that there is still something to be reaped in the field of conventional manufacturing methods if one goes to work with imagination, pleasure in experimenting, and a potent machine tool manufacturer.

In place of the old method of turning at full speed, planners went to a new technology. The planetary wheels are no longer produced from bars on multiple-spindle automatic lathes but from cold-extruded blanks on CNC [computer numeric control] automatic lathes from the firm Feinbau with automatic parts passage, cutting measurement and post-process measurement of each individual part to control the cutting dimensions. The first result: large saving of material, reduction of clock time, and substantial improvement of quality. And CNC controls are prospectively the basis for the future optimization of automation at the transmission plant.

If one leaves the planning floor, where engineering diplomate Karl-Heinz Lehne and his colleague Dieter Eh thought out and planned the new procedure, and goes to the place where the first four Feinbau machines have been set up, then there can be no doubt that one is in Europe's largest transmission plant. Just under 8,000 shift transmissions and 1,200 automatic transmissions are produced here every day for all of the vehicle types of the VW concern.

As Dieter Eh explains, the timing for the conversion to the new method is by no means arbitrary: "Beginning in 1986, a new four-speed automatic transmission will go into series production, in which not only the planetary wheels but also the other geared wheels belonging to the planetary set are to be manufactured from cold-extruded parts. So that we will not be jumping into cold water, we are already testing this method with today's series parts." In this connection, these parts are found in every automatic transmission: the planetary wheels for the reverse gear with a diameter of 31 mm and a height of 18 mm as well as the somewhat smaller ones for the forward gear. The four systems are set up identically. Extruded wheel blanks of 16MnCr5 are emptied by an

operator--who at present is responsible for all four systems--into the bin, from which an inclined conveyor transports them to a trough leading to the machine. The noise that is normally associated with inclined conveyors is not heard here. Both the bin and the discharging installation are insulated against noise.

The last part of the trough is designed as a magazine, where two approximation initiators have been installed that, depending upon how full it is, induce the inclined conveyor to work or transmit to the machine control when the magazine contains no more parts.

Two Grasping Arms for Loading and Unloading

The machine involves an SNC 100 adapted for this special part and controlled by a Sinumeric System 3. In the machine's workroom, two grasping arms carry out the automatic loading and unloading of the chuck. Once the blank is tightened, three tools give the planetary wheel the necessary form for the subsequent milling. The first chisel preliminarily shapes the end face and the boring, the second completes the shaping of the external phase, end face and internal phase, and the third tool gives the "finishing touches" to the boring. The unloading arm reaches into the boring and dispatches the part into a discharge trough. So what? One will say that so far the whole thing is not exactly sensational.

The highlight, however, is the trough line that conducts the workpiece to the finished-parts box. In a measuring cage, each part runs up against a detent. A measuring pin then checks the dimensional accuracy of the boring, the most critical measurement for further processing. The indicator immediately shows the extent to which the measured boring deviates from average H7-quality. The overall tolerance of $\pm 9\mu$ is certainly not sufficiently accurate for the transmission builders.

Exceeding of Tolerance Automatically Corrected

It is restricted once again. If the parts deviate from the average by only $\pm 4\mu$, then the machine can continue to work without change. If the deviation is greater, then the measuring unit signals the exceeding of tolerance to the machine control, which then automatically corrects the tool setting. Planetary wheels whose boring diameters deviate from the precise dimension by more than $\pm 7\mu$ are no longer accepted. They are switched to the refinishing box where rejects naturally also turn up. The measuring facility was delivered by the firm Marposs and was integrated into the machine control by Feinbau.

Another subtlety of the system is the automatic cutting measurement. A tool carriage holds a cubical revolving head that is equipped with four tool sets, each of which includes the three cutting-tool steels necessary for machining the planetary wheels. If the turret is provided with fresh cutters, then the operator has only to turn on the machine. There is no tedious adjustment work, for the machine carries out a measurement program prior to the turning.

In the workroom of the machine, a fixed measuring pin serves as a point of reference, against which measuring calipers move in the x- and y-direction. This measurement serves as the 0-measurement. After that, the three cutters of

the first tool set are driven one after another against the measuring pin and measured. The computer control registers the amount measured and makes the necessary changes in the programmed values. If nothing unexpected happens and the bin contains enough unprocessed parts, then the operator can leave this machine alone for the next 5 hours. Only then does the machine automatically stop and summon personnel with a red warning light so that they can turn the cutting plates for all four tool sets. With a clock time of 22 seconds and a service life of 200 parts per tool set, the turret swings the next tool set into machining position after just under an hour and a quarter, and this tool set begins its work following the automatic measuring procedure.

Rejection Rate Far Under 1 Percent

The greater the demands on accuracy, the more likely it is that a part will fall short. What kind of a rejection rate is there? Foreman Erwin Albrecht can give only a rough estimate: "Far less than 1 percent." When questioned about the percentage of reworked parts, he must calculate: the box that receives the parts to be reworked holds 500 workpieces. It is emptied and processed only once every 3 weeks; 1,700 planetary wheels are produced per machine every day, so....

When the four machines were set up 6 months ago, there were naturally some initial problems, admit Dieter Eh and Erwin Albrecht. There were some problems with the shavings flow. The cutting-tool steels produced strip shavings that wound around the tools and led to broken cutters and a considerable amount of reworking. This problem was controlled by strengthening the tool holder, changing the tool geometry through different shavings-guidance levels and other radii of the cutting edge as well as by increasing the feed and the number of revolutions per minute from 4,000 to 5,200.

Feinbau Lathes Solve Shavings Problem

Dieter Eh explains the cause: "The blanks are cold-extruded in Wolfsburg from soft-annealed material that, as everyone knows, is more difficult to machine than normally annealed material. But our colleagues in Wolfsburg had more difficulties in cold forming with normally annealed material. And so we said to ourselves: we have the most up-to-date machines, with which everything can be varied, so we will take on the difficulties."

Success bears him out. The problems have now shrunk to the usual proportions resulting from the varying quality of the cutting steels and material of the unprocessed parts. So it is a pilot project that hardly had to experience the usual growing pains.

"The main reason for the investment was also the rationalization that can be achieved with this new production method," admits Karl-Heinz Lehne. The planners in Kassel must have been rather sure of themselves and must also have had confidence in the supplier Feinbau, otherwise they probably would not have ordered four identical systems right off the bat.

To be sure, it is no accident that Feinbau was awarded the contract ahead of three competitors. As early as 1967, when VW began the production of automatic

transmissions, Feinbau was one of its suppliers. And at the beginning of 1983, when Karl-Heinz Lehne suggested to the plant manager that they order the Swabian machines, he was ready with a cogent argument: up to that time, a Feinbau machine acquired back in 1967 had incurred only DM1,800 in repair costs.

Amortization Time Less Than 2 Years

If, then, it is primarily a rationalization investment, what do the transmission builders have under the bottom line? The people in Kassel would rather not say what is above the line--that is, the sum that VW must send to the Swabian Winterbach. It seems that other machines were acquired for the production of the planetary wheels and for the hardness testing of the cogs, and a differentiation of the capital expenditures is hardly possible.

All right. "But we are quite certain that the amortization time for this project is less than 2 years, just as we planned it," says Karl-Heinz Lehne in revealing a little bit of the secret, adding: "Our return on capital is about 35 percent and thus corresponds to the expectations that VW places on an investment."

To be sure, today an additional production procedure--that of cold-extrusion--is required relative to production on multiple-spindle automatic lathes, but that is more than compensated through the material saved. Previously, in using bars , 45 percent of a part was machined away in the turning, but it is now only 5 percent. A fundamental advantage of the new production method is the fact that only high-precision parts are passed on to the following milling work. All rejects are eliminated through measurement control. In addition to the precision of the boring, the accuracy of the end face is important in the milling, for two planetary wheels are milled simultaneously end face against end face.

Subsequent Production Became Substantially More Reliable

Previously, in production from bars , the end faces did not always meet precision requirements because of the cutting off. Erwin Albrecht explains: "The milling machine operator could not look at the parts and tell when they were not exactly right. Then the milling machine quickly produced 20 or 30 defective parts before the man noticed it." And Karl-Heinz Lehne summarizes: "The new method made the subsequent production of the planetary wheels substantially more reliable. That was also one of the reasons for the conversion of production from rod parts to cold-extruded parts."

The reduction of the clock time from 25 to 22 seconds will not take full effect until Feinbau has fulfilled the entire contract. For it is not to remain with the four systems now in place. Another 16 are to be added during the course of 1985. The flexibility of the systems, otherwise a strong sales argument for CNC machines, is of precious little interest to the production planners in Kassel. After all, the planetary wheels are a long-lasting project that have been manufactured without change for about 5 to 8 years. The transmission builders need the CNC control to optimize the average values on the basis of current measured data and beyond that "to optimize the automation of our production," as Dieter Eh calls it.

The Planning Foresees Production Lines

In the course of the production of the new four-speed automatic transmission beginning in 1986, the idea is to adapt the lathes that are still being set up individually. Production lines are then to be set up in which the cold-extruded unprocessed parts are turned, milled, and scraped with measuring stations between each process. This method that has been tested in the production of planetary wheels will naturally have additional effects. In closing, Karl-Heinz Lehne takes a brief look into the future by saying: "In the coming years, our program includes large investments, and we are already thinking about reformulating the wheel production of our transmission plants."

PHOTO CAPTIONS

1. p 14. The components of every system: noise-insulated bin with inclined conveyor, parts trough and magazine with monitoring of the load level, lathe with automatic cutting measurement and automatic loading and unloading, and measuring cage with post-process measuring of every workpiece.

2. p 16. Foreman Erwin Albrecht (right) now has only good things to report about "his" machine to Karl-Heinz Lehne, in whose department the new procedure was planned. The changeover to extruded parts was worthwhile.

3. p 16. The cubical revolver holds four sets of steel cutting tools with three tools each. Each tool set is automatically measured and swung into the machining position when the preceding set has reached the programmed service life of 200 parts. The means of measuring the cutting: the measuring calipers with spherical head (left front). The neutral points are redetermined with the calipers for each newly changed tool. Photos: Feinbau/VW.

4. p 16. The workroom of the Feinbau machine with tool revolver, the grasping arms for loading and unloading, and the discharge trough for the finished parts.

5. p 18. The discharge of the finished parts: the good parts travel in the open trough and those "dropped" by the measuring facility fall through the tube into the rework basket.

6. p 18. The unloading arm has deposited a finished part in the trough and now has 22 seconds "rest" before the next action.

7. p 18. The measuring pin drives into the boring of a finished planetary wheel.

8. p 21. In the beginning, there were problems with the removal of shavings. They were too long. After some changes in the cut values and cutting geometry, shavings are no longer a problem.

9746
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FACTORY AUTOMATION

SIEMENS COMPUTER PLANT AUTOMATES SHEET METAL FABRICATION

Duesseldorf VDI NACHRICHTEN in German 29 Mar 85 p 13

[Article by Th. Weber: "Sheet-Metal Treatment From All Sides: Three Firms Present Components of the Manufacturing Plant of the Future"]

[Text] Beginning this year, the largest computer plant of Siemens AG in Augsburg has been manufacturing all sheet-metal parts in the prefabrication area fully automatically around the clock. What does the introduction of the most up-to-date manufacturing technology have in store for the manufacture of sheet-metal parts? Automation for the smallest lot sizes as well? These and other questions were discussed on site in Augsburg this spring. In this connection, invitations were issued by Behrens, the manufacturer of automatic sheet-metal processing centers; Lingl, responsible for the automatic sheet-metal warehousing system; and Weinbrenner, supplier of the automatic flexible cell for the sheet-metal factory.

Capacity leaps in the spectrum of data processing systems and thus necessarily in the case of the widely used sheet-metal parts was an important reason for the restructuring of the Siemens' manufacture of sheet-metal parts, which has now reached an initial milestone. The core of the new sheet-metal manufacture is the production system for the complete profile processing of level sheet-metal parts in small lot sizes. Basically, the system processes only Euro-norm sheet-metal plates in the small and medium-sized formats (1,000 x 2,000 or 1,250 x 2,500 mm), whereby it was possible to design the Lingl warehousing system in an optimum manner in its dimensions and complexity.

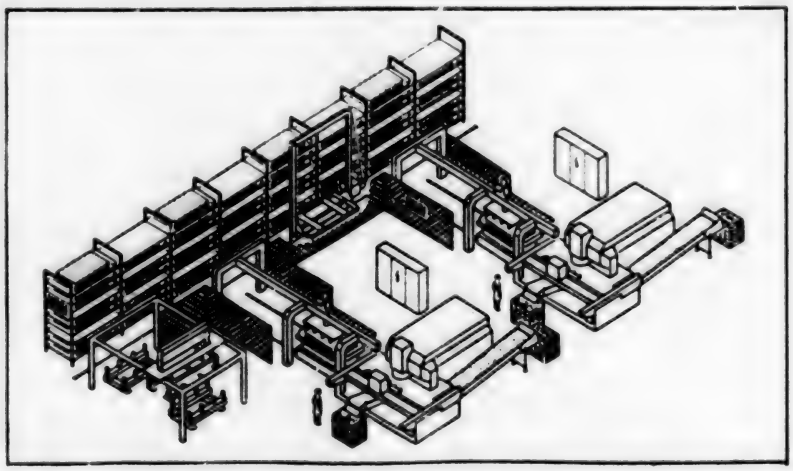
A Siemens S 5/150 automation unit was employed to control and monitor the warehousing system. The control system is equipped for display technology, error and system diagnosis and coupling with the Siemens computer for warehouse management.

A precondition for the realized favorable warehousing solution was that both sheet-metal processing centers of the Behrens firm process standardized formats, that is, that they be able to perforate, contour, cut to size, and remove automatically. In this connection, it was of additional benefit that beyond the high punching precision of the machines, the cutting of the workpieces with identical clamping eliminates the previous precision problems between the

workpiece edge and the workpiece hole pattern. That, in turn, is an important prerequisite for the automated further processing in the robot/flexible cell. With a parts program, then, perforated and cut workpieces are produced without the material being touched by hand even once.

A sheet-metal processing center BZ 30 and a revolving cutting press are currently being used in the system. Extensive experience has already been accumulated with the revolving cutting pressin use since the fall of 1983 and equipped with automatic loading and unloading equipment. In the first 12 months, a net production output of 83 perforations per minute was achieved in three shifts (in nibbling, the beginning of the nibble is counted as a stroke). In this case, net means production after subtracting all nonproductive time such as equipping, waiting, repairs, etc.

Despite this in itself already very high productivity, this machine will be replaced in April with a second BZ 30. The reasons are the 80 percent higher work speed in edging and separating--for 200 mm can be cut per stroke (18 meters per minute)--and the reduction in the cleanup speed at the separation station from 6 seconds to 2 seconds per part. The finished parts then move by conveyor to transport containers, where they are currently still in organized intermediate storage.



Production System for Sheet-Metal Parts: By Means of Discharge Carriages, Two Processing Centers Are Directly Linked With the Automatic Depot

The problematic nature of the aspired manufacture of complex punched parts with a great variety of types on processing machines linked to tools is in the high cost of preparation caused by the great number of orders with different tools for each order. Through the use of an "order-sequence-optimization" developed by Siemens, an effort is being made to minimize the resulting preparation times with the result being a greater available capacity at the sheet-metal processing centers and more flexibility through smaller and economical lot sizes.

For Siemens, the trend also evident in the production of sheet-metal parts toward the integral type of construction with increasingly complex sheet-metal

bending parts to lower expenditures for fitting and assembly is being met through the use of a fully automated flexible cell developed by the firm Weinbrenner and equipped with an industrial robot.

The Mantec industrial robot suspended from a portal takes over the transport of cut sheet metal between the preparation point and the die as well as the handling of the "intermediate bending stages" in the die and--if necessary--between the individual tool stations that can be set up parallel in the machine (no tool change necessary). The exact positioning of the sheet-metal parts on the detents is achieved through separate positioning devices that are integrated into the laterally mobile support tables, whereby a more rapid and more exact work flow is guaranteed. The finished sheet-metal bending parts then go by way of conveyors to transport containers as an intermediate buffer prior to being transported out for assembly.

The linking of the individual work stations in the production of sheet-metal parts is to be realized in the next development stage. The integration of the various areas such as welding, straightening, latching, bending, reworking, and punching/nibbling into an overall production system requires, with the existing relatively tight space conditions, flexible solutions for the material flow. In the final development stage, therefore, inductively guided floor conveyors should take over the entire material flow in this area.

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MICROELECTRONICS

FRANCE'S NORBERT-SEGARD CENTER FOCUSES ON CMOS RESEARCH

Paris ZERO UN INFORMATIQUE HEBDO in French 4 Mar 85 pp 22-23

[Article by Eric Marshall]

[Text] The Norbert-Segard Center (CNS) in Grenoble is one of CNET's (National Center for Telecommunication Studies) six research hubs. Created in 1977, it now covers about 9000 sq-meters of beautiful buildings at the Grenoble-Meylan ZIRST (Zone for Innovation and Scientific and Technical Production).

Covering nearly one hectare, of which 3000 sq-meters of laboratories and 2000 sq-meters for pilot lines on which are designed and built the first series of integrated circuits, CNS is above all a microelectronics research site.

Intended to help bring French technology back into the lead, it designs and develops circuits which will be used by the Directorate of Telecommunications itself.

This centers brings together about 300 persons, of which more than 150 are engineers, and operates according to a guideline plan covering the 1983-1986 period, which in turn can be summarized as follows:

Planned for the end of 1984, completion of the one-micron CMOS device, to be validated by a switching matrix;

And for the end of 1986, completion of a specific telecommunication sector, validated by a video decoding circuit for a consumer television set.

Well Defined Responsibilities

Researchers at CNS are distributed into three major divisions, which cover fundamental research as well as the practical aspects of industrial production.

The RPT division (Physics and Technology Research) is responsible for basic physics research on future materials and fabrication processes.

It consists of four departments: plasma-surface interactions, polymer and ion machines and applications, lithographic materials and characterization, physics of materials and devices.

The CCI division (Integrated Circuit Design) is responsible for finding new rules of general architecture, developing CAD (computer aided design) methods, as well as modeling and simulation. It is a very large division which deals both with products and with the development of machines for their production. The product and the tool: it is often the fate of research organizations to find themselves in this situation.

Five departments contribute to the tasks entrusted to this division: microsystem architecture, design methods and circuits, modeling and evaluation of devices and technologies, CAD research (one of the center's great successes), as well as as computer technology and office automation, which is somewhat surprising at this location.

The third division is DTF (Technical Development and Fabrication). It is not enough to imagine and design, one must also fabricate. That is the goal of this division, which develops new product lines, attempts to improve individual and assembly techniques, and so on. Three departments share its work.

Good Results

Since its creation, CNS has undeniably obtained good results. Not only has it achieved its objectives of developing the original electronic sectors stipulated by its guidelines (its "order book"), but in the process it has also become known in ancillary fields.

In basic technology for instance, CNS has developed molecular beam epitaxy processes for silicon films and reactive ion etching, has mastered the production of porous silicon, and has even succeeded in fabricating 0.2 micron-wide and simulation transistors. One of its programs, Titan, has become famous, just as Basil in CAM (computer aided manufacturing). This is a computer system for data collection and stage by stage management of all phases of a circuit's fabrication.

In CAD especially, the center has earned its stripes (1984 CNET prize) through the creation of Cassiopee, a design system for high density circuits, provided with a data base for circuit representation, and with two languages, one for description, the other for control. Cassiopee has in fact been selected as the basis for the national project Coralie (which is in a way the transition of the Cassiopee project to an industrial level, the project itself being an integral part of the national project VLSI Sycomore); all in all, a good reference.

Added to this is the fabrication of a machine to mark silicon wafers with a laser beam, transferred to the company SET in Savoie, where it is currently being marketed.

Circuits and Product Lines

The center's objective is to achieve a one-micron product line in CMOS technology. An ambitious goal--without relation to the first product established at the end of 1980, the 1-3 micron HMOS--but one which should be achievable stage by stage. The first stage is a 1.5 micron CMOS which has just been validated by a wide-band switching matrix (16 inputs, 16 outputs, and 108 Mbps).

The one-micron product line should be completed at the end of 1986-beginning of 1987, and should be validated by a video decoding circuit (digital filtering and two other functions). In other words, all out for the CMOS.

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MICROELECTRONICS

DESCRIPTION OF ESPRIT FIVE-YEAR SUBPROGRAMS, THEIR MANPOWER

Paris MICRO-SYSTEMES in French March 85 pp 118-119

[Text] The Esprit program contains a number of objectives for 1988, and proposes several research and development areas for the next five years. All the major objectives require projects exceeding a critical size, which thereby justify the joint transnational approach that has been selected.

The 1984 program was prepared on the basis of studies conducted by about 300 specialists chosen from among 1000 candidates, which had declared themselves ready to contribute to the program in industry, in universities, and in research centers.

It continues the five-category classification of the first proposal (26 November 1983). This distribution is in no way dictated by the actual nature of the tasks--which on the contrary, are closely interconnected, is not at all final, and is justified solely for management reasons. The distribution of man/year resources stipulated by the program is shown in table A.

Each project in a subprogram is described as a five-year program, generally resulting in a mock-up or a finished product. Intermediate objectives are also provided.

Subprogram 1: Advanced Microelectronics

This subprogram is essentially concerned with improvements in MOS and bipolar processes, aimed at the design of submicron VLSI (very large scale integration) circuits with several million components, intended for a broad range of applications and involving the perfection of all stages of the process, such as lithography, etching, doping, and so on.

"One cannot emphasize enough CAD's (computer-aided design) importance to VLSI for the general success of Esprit," points out the Commission of European Communities (EEC). "With a good technology and first quality CAD, the highly innovative European industry will be in a position to successfully sustain competition on the world market."

Table A (from J. O. DES COMMUNAUTES EUROPEENES, No C47, 20 February 1984)
(in man/years)

Subprogram	Years 1	2	3	4	5	Totals
1. Advanced microelectronics	186	258	360	410	456	1670
2. Software technology	177	317	343	318	285	1440
3. Advanced information processing	140	281	392	441	441	1695
4. Office automation	210	310	440	390	100	1450
5. Integrated production by computer	121	216	215	220	172	944

Various CAD projects are thus defined: CAD management, high-level design and implantation, advanced innovative CAD, establishment of CAD centers.

Lastly, two other projects are added to this microelectronics heading. One covers research on III-V semiconductor compounds, particularly gallium arsenide (GaAs) and GaAs/GaAlAs structures, and on new materials such as GaInAs. The other concerns the associated field of optoelectronics, which also uses type III-V integrated circuits, and which is expected to result in the application of optical techniques in computers.

This group of type A projects suggests the following topics for type B projects:

Topics related to VLSI: lithography (electron beam, X-ray, ultraviolet); ion implantation; semiconductor materials; photosensitive resin technology; conductors and insulators; device reliability; computer-assisted manufacturing (CAM) methods; and so on.

Miscellaneous topics: interconnection (off-chip); advanced physical analysis techniques; flat screen display technology; sensors and transducers; new technologies for advanced information storage; new organic and inorganic materials.

Subprogram 2: Software Technology

The objective of this subprogram is to reach a stage at which the production of information systems (meaning products that include hardware and software) would acquire the characteristics of industrial production and would be mostly computer assisted.

The progress to be made in software technology was divided into three major independent categories. The first must help achieve a better understanding of the software production and maintenance process, starting with the most satisfactory current practices. The second concerns the implementation of software support (including the necessary tooling) which will lead to a practical utilization of this study's results. The third category includes research and development efforts aimed at formulating new software production methods.

Software evolution, from initial concept and operational system, will occur by iterations and will almost never be linear. That is why the work plan can be divided into three research and development sectors: actual procedure (technique); management and control; support environment. A fourth sector is aimed at the formulation of new methods. Lastly, a fifth sector consists of demonstration projects which would not be simulated but practical, to be used for evaluation and demonstration.

Subprogram 3: Advanced Information Processing (TAI)

Intelligent systems are the major topic of this area. They include the acquisition of knowledge, the storing of this knowledge with access facilities, and the utilization and improvement of the knowledge basis. One of the major objectives is to facilitate the utilization of computers by non-technical users through an interface as intelligent and natural as possible.

The information technology sector concerns the tools and techniques necessary for the development of commercially and socially acceptable applications of knowledge-based systems (KBS), examples of which are expert systems, and computer assisted aids for decision and education. A large portion of the program will have to be devoted to dialogue and communication languages, special fields in which KBS applications are expected to be developed. This field involves a large number of type B research topics, notably in terms of natural language systems (cognitive psychology, psycholinguistics, semantics, and so on).

Data input into the computer will occur through direct communication with people, which involves new types of external interfaces. In this sector, activities will concern two major aspects: analysis and recognition of basic signals, and recognition of specific signals (writing, speech, analysis of objects and movement, image synthesis).

The efficiency of any KBS depends on the quality of its knowledge base and its deduction mechanism. The storage of information and knowledge plays an important role in this case. The topics to be studied in this field are: interface between storage and environment; data and knowledge base. Subsequent projects will treat storage structures and architecture, new generation cognitive machines, research into means of storage (intermediate term), and lastly, research on optical disks and biologic storage (long term).

New forms of computer architecture will be the object of the fourth section. VLSI technology will allow the creation of alternatives to the traditional architecture known as von Neumann architecture. Many types of applications could profit from this multiple processor approach, ending up with super-computers.

Finally, the other activities of the TAI subprogram concern design and systems aspects, covering technical standards for specification and verification, design methods, general systems methods, information catalogs, and technical control.

Subprogram 4: Office Systems

Research into office systems can be characterized as follows: based on fundamental and methodological developments of VLSI circuits, on software technology, advanced information processing, and some other fields, integrated and applied system solutions will be developed, which will consider the needs of users and foreseeable modifications in technical, social, and economic areas.

Office systems are the key elements in the development which will make it possible to move from conventional data processing to integrated information processing in administrations as well as in industrial and service enterprises, a progress which will characterize the future professional environment.

This subprogram is split into the following five research areas:

Science of office systems and human factors;

Advanced work stations, which will include new man-machine interfaces (data, text, image, speech);

Communication systems (integrated information networks and systems require a new concept of systems, involving very broad band networks which use fundamental technologies to process and transmit large quantities of data throughout the world);

Advanced classification and research systems;

Design and evaluation of an integrated office system.

Subprogram 5: Computer Integrated Production (PIO)

The major specific objectives of this subprogram are:

Lay the foundations necessary for the creation, development, and formulation of principles and rules for future competitive PIO components or complete systems;

Produce the architecture of complete systems allowing users to progressively adapt to PIO systems;

Guarantee the application of the development program with equal success in small, intermediate, or large enterprises.

This last subprogram includes six sections: architecture of integrated systems; CAD/computer assisted integration (artificial intelligence); computer assisted production; machine control systems (robotics); subsystems and components; applications.

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MICROELECTRONICS

'INSUFFICIENT ALLOCATIONS' PLAGUE FRENCH ELECTRONICS

Paris ELECTRONIQUE ACTUALITES in French 5 Apr 85 pp 1, 2

[Article by D. Levy: "Mobilization Program of the Electronics Sector Checked by Insufficient Allocations"]

[Text] A symposium on "research and development in the electronics sector" was held in Paris on 19-21 March in an attempt to draw the lessons from the mobilization program "Mastery of the Electronics Sector," as the orientation and programming law on research and technology is about to expire. The government was faulted mainly for inadequate credit allocations, which hindered the research efforts undertaken in particular for components, materials and data processing. The search for selective themes--we should not speak of market niches in this case--and for increased specialization of public organizations also constitutes the new outstanding orientations of the mobilization program.

The grumble against the mobilization program "Mastery of the Electronics Sector" suddenly quieted during the meeting that just discreetly took place in Paris. Certainly, there was no lack of grievances addressed to the government, but the results achieved were not disputed. The main grievance was the lack of credits--"allocutions are replacing allocations," Mr Aigrain noted--putting the Ministry of Research and Technology (MRT) on the spot: being the result of the orientation and programming law, the mobilization program is therefore the MRT's business. But the latter contributed only about FF 200 million (i.e. 20 percent of the research fund); there were additional appropriations from the Ministry of Posts and Telecommunications and the Ministry of Defense, but they are still a far cry from the FF 4 billion announced!

Participants at the meeting also denounced the lack of research efforts, in particular on software packages, materials and artificial intelligence. Others raised a basic issue, wondering whether this is really a "mobilization" program. It is doubtful, they answered, pointing to the fact that the CNRS [National Center for Scientific Research] is playing almost no part in the electronics sector, and that industrial research is still unable to find adequate resources whereas many calls are made upon public research.

At the start of the symposium, Mr Curien, minister of research and technology, stressed the necessity to launch large technological development programs so

as "to become the best in a few well-targeted sectors," and he denounced the apathy of researchers' evaluation commissions that do not adequately take into account mobility and technological work. Among the participants' observations, we should mention the call for an effort on fine chemicals for electronics raw materials, the need to "market" microelectronics research, to have research teams work two eight-hour shifts to achieve profitability of major equipment (the LETI [Electronics and Data-Processing Technology Laboratory] will set an example), to build production plants for specific circuits, to ensure wide dissemination of very-large-scale integration CAD software.

Finally, we noted the new orientations of the CEA [Atomic Energy Commission] (now focussing on materials-components-systems interaction, and on the mutation from the military to the civilian sector), of the INRIA [National Institute for Data-Processing and Automation Research] (toward automation), of the CNET [National Center for Telecommunications Studies] (toward data processing and office automation, in addition to telecommunications) and of the CNRS [National Center for Scientific Research] (which might direct its efforts toward regional poles and take better advantage of its multi-disciplinarity).

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MICROELECTRONICS

BRIEFS

ICI GALLIUM ARSENIDE WAFERS--The English group ICI [Imperial Chemical Industries] just created ICI Wafer Technology Inc. to develop, produce and market gallium arsenide (GaAs) and indium phosphide (InP) in the form of ingots and wafers, using knowhow and technologies bought from Cambridge Instruments Ltd. (Czochralski process under liquid encapsulation). ICI Wafer Technology just set up a production unit at Milton Keynes, Great-Britain. It sells polycrystalline and monocrystalline GaAs ingots 2 inches, 3 inches and 100 mm in diameter, wafers with a 100 or 111 orientation, polished wafers 2 and 3 inches in diameter, and semi-insulator and semiconductor varieties of polycrystalline wafers for vapor-phase epitaxy. It also sells InP ingots 2 inches in diameter (polycrystalline and monocrystalline; N, P or undoped types) and polished and unpolished wafers. The English company is also pursuing an important program to improve polishing methods and the methods used to reduce crystal-defect densities in wafers. [Text] [Paris ELECTRONIQUE ACTUALITES in French 5 Apr 85 p 15] 9294

FIRST EUROPEAN GaAs FOUNDRY--MEDL [expansion unknown] just announced the opening of the first European GaAs foundry at the GEC [expansion unknown] research center in Great-Britain; the foundry will produce microwave, optoelectronic, digital and analog components and integrated circuits. The new MEDL division, called MASF (MEDL Advanced Sample Facility) is announcing typical processing times of four weeks for batch production, from the moment design data are received on magnetic tape. Users who want to use MASF's services must simulate their circuit on a Vax computer and define its layout with a traditional CAD system (Applicon for instance). Starting from the design data, MEDL uses an electronic masker to etch the circuit patterns directly on 3-inch wafers. Circuits are delivered tested and with their specification sheets. [Text] [Paris ELECTRONIQUE ACTUALITES in French 12 Apr 85 p 18] 9294

NEW SIEMENS U.S. PLANT--Siemens Components Inc., the U.S. subsidiary of Siemens, just decided to invest $10 million in the United States, to build and equip a class-10/100 white room and a pilot production line exclusively dedicated to GaAs integrated circuits. This investment is part of a 5-year plan intended to assert Siemens' entry on the GaAs integrated-circuit market and to expand the production capacities of Microwave Semiconductor Corp, another Siemens subsidiary, which has been using GaAs technology in its field-effect transistors, amplifiers and other microwave-frequency semiconductors for already 4 or 5 years. In particular, the plan provides for the construction of

a new 2,500-m^2 production unit (to house the white room and the pilot line) at a site that has not yet been chosen; the plant should be operational in 12-18 months from now. The first products to be sold by Siemens as a result of this investment should be improved versions of the GaAs power semiconductors it is already manufacturing, followed by integrated circuits within the next 2 years. [Text] [Paris ELECTRONIQUE ACTUALITES in French 12 Apr 85 p 18] 9294

PHILIPS PROPOSES ESPRIT PROJECTS--Philips has already submitted to the EEC 25 projects to be financed as part of the second wave of ESPRIT [European Strategic Program for Research and Development in Information Technology] projects, which will be launched this summer. The Dutch group is represented in 17 projects of the first ESPRIT instalment, currently in progress. Subsidiaries outside the Netherlands are involved in 40 percent of these projects (in particular, we should mention that the LEP [Electronics and Applied Physics Laboratories] is cooperating to a project on gallium arsenide, that RTC [Radiotechnology-Compelec] is collaborating to a project on bipolar integrated circuits, and that TRT [Radioelectrical and Telephone Telecommunications] is involved in another project on software). In these 17 projects, involving also in particular computer-integrated manufacturing and office automation, Philips is cooperating with a total of about 60 partners, including about 10 French companies (Thomson, Bull, CGE [General Electricity Company], Cap Sogeti Gemini, etc.). [Text] [Paris ELECTRONIQUE ACTUALITES in French 12 Apr 85 p 2] 9294

CSO: 3698/537

SCIENTIFIC AND INDUSTRIAL POLICY

REPORTAGE ON SUMMIT OF LEADERS IN MILAN

High Tech Cooperation Plans

AU281954 Paris AFP in English 1948 GMT 28 Jun 85

[Text] Milan, Italy, June 28 (AFP) -- European Economic Community (EEC) leaders today agreed to launch into high technological cooperation based on the French-proposed Eureka programme aimed at countering the U.S. Strategic Defence Initiative, the so-called "star wars" project.

French Foreign Minister Roland Dumas said an ad hoc committee to define the areas of cooperation would meet in Paris before July 14 with the 10 current EEC nations, plus Spain, Portugal, Austria, Switzerland, Norway and Sweden each sending two ministers. The ministers would be looking into the financing of the technology programmes, Mr Dumas said.

The EEC leaders, who opened their two-day European Council meeting at the Sforza Castle here today, also agreed to study the possibility of using European Investment Bank facilities to finance the programmes, Mr. Dumas said. He added that British Prime Minister Margaret Thatcher proposed setting up European technological norms to be called "Eurotypes" or "Eurekatypes".

The EEC leaders also agreed on a plan to make Europeans more aware of their links with a political, cultural and economic unity, a French spokesman said. The plan, known as "Citizens Europe," includes a European cancer research centre, the right to vote in other EEC countries if you are resident there, a multilingual television station, European sports teams, a European flag and a book of European history.

Eureka Approved

LD282206 Paris Domestic Service in French 2000 GMT 28 Jun 85

[Excerpt] The first day of the European Council ended with an agreement on setting up a technological Europe centered upon the French "Eureka" project. Listen to the reaction of Elysee spokesman Michel Vauzelle:

[Begin recording] It was a question of making certain that Europe will be equipped for the big technological battle the Americans, Japanese, and Europeans are waging. If we want an independent Europe in possession of its means of independence and want to preserve its identity, then we must have the technological means [to do it]. Hence the Eureka project. It had great success with the Community governments as well as with the governments of other countries with which agreements could be reached or are in the process of being reached, either at government level or at the level of private enterprises. Outside the Community these countries are Austria, Norway, Sweden,

and Switzerland. The Council adopted what France had proposed in its memorandum and it was decided that an ad-hoc committee will meet in theory before 14 July in France, in Paris, in order to implement it quickly with one or, rather, two representatives from each Community country and a representatives of the commission. [end recording]

French Suggestions

HK290338 Hong Kong AFP in English 0201 GMT 29 Jun 85

[Text] Milan, June 29 (AFP) -- A French memorandum to the EEC summit leaders here states that the "Eureka" scheme for technological cooperation that they are considering should be open to "any suggestion" and not be a pre-established mold.

France considers that the project should include establishment of a European university and standardization of national university diplomas. A "unified market" should be achieved by 1992 by "suppression of national norms, regulations, and tax barriers" restricting trade. France also suggested that use of the European currency unit (ecu) be increased and that the European monetary cooperation fund be turned into a "European monetary fund."

High-speed trains on the axis Paris-Brussels-Cologne-Amsterdam with a trans-channel link would be "perfectly feasible", the memorandum assures. The proposed "Europe of citizens" should include common efforts against cancer, a European fund to translate writings in the member countries, a European youth office, and the right of citizens who move to neighbouring countries to vote in their local elections, the memorandum suggested.

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SCIENTIFIC AND INDUSTRIAL POLICY

RESEARCH MINISTER DISCUSSES GUIDELINES ON EUREKA

LD251346 Hamburg DPA in German 0953 GMT 25 Jun 85

[Text] Bonn, 25 Jun (DPA) -- The Federal Government looks forward to the development of application-oriented technologies through European research cooperation (Eureka). Minister of Research Heinz Riesenhuber (CDU) made this clear in a statement distributed by his ministry on 25 June, after the Cabinet committees on research and European politics had discussed the preliminary guidelines for the Eureka concept under the leadership of Chancellor Helmut Kohl on 21 June.

In the activities preceding the Milan EC summit which begins on 28 June, at which technological cooperation will be an important point on the agenda, FRG-French talks on this subject will take place in Bonn on 26 June.

The research ministers of both countries have been included in a round of foreign and defense ministers' talks which will include security questions.

Riesenhuber stressed that cooperation must be aimed at tasks which help strengthen the ability of the European economy to compete, transcend the capabilities of individual West European states, and are of benefit for the Federal Republic. This is not directed against participation in the U.S. SDI research program. Eureka should make possible a boost for civil technology by way of joint research programs, the development of common norms and infrastructure, or the improvement of the process of allocating public contracts to European enterprises. As possible main themes of research and development, the minister named the development of supercomputers, as suggested by France, and the overcoming of transborder problems of highly toxic waste. Eureka should be open for the EC states as well as for other Western European countries. In individual projects attention must be paid to the appropriate participation of industry, including sharing the costs.

The fundamental Eureka concept, and the question of financing are to be clarified in detail over the next few months according to Riesenhuber. His statement points out that there is already varied European cooperation in science and technology, such as joint space activities and cooperation of enterprises and science in the field of nuclear physics. About DM4.5 billion will be available this year for joint European research establishments.

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SCIENTIFIC AND INDUSTRIAL POLICY

DUMAS DISCUSSES 'POSITIVE' RESPONSES TO EUREKA

PM021059 Paris LE MONDE in French 28 Jun 85 p 3

["Ph.L." report: "Mr Davignon Could Be Appointed 'Mr Eureka'"]

[Text] Brussels -- Etienne Davignon could be appointed "Mr Eureka" or "Mr Technological Europe" in Milan if the Ten approve a proposal which, if there are no last-minute problems, the Italians and French will present. The former vice chairman of the European Commission would thus be given a task of leadership and coordination between what relates to the Community and what does not.

Mr Davignon's ideas are known -- the practical approach adopted by the French in launching Eureka is good but has its limits. If there is a desire to mobilize the enterprise chiefs, it is appropriate to define a "central program," in other words the spheres in which Europe wishes to take action and then, to implement this program, to chosse the most appropriate structure namely the Community, according to Mr Davignon. On the other hand, the implementation of projects in the framework of this central strategy would be carried out in a decentralized way according to the concept of "variable geometry."

The letter which Mr Dumas has just sent his colleagues in the expanded Community to inform them of the results of the initiative launched 2 months ago reveals that the French Government, even if it is talking of the "coordination of programs" is still reluctant to involve the Community apparatus in drawing up the content of European technological cooperation. "All our partners with the Ten, as well as Spain and Portugal, have given a positive reply. Thus, thanks to the many contacts we have had since mid-April Eureka has already become a truly European project which reflects our joint ambitions in the advanced technologies sphere," Mr Dumas writes. "In this connection it should be noted that several European countries which are not members of the Community, especially Austria, Norway, Sweden, and Switzerland, showed strong interest during various meetings. I think it is therefore in our interest to involve them immediately in joint projects which are decisive to our future."

The external relations minister continued: "All these exchanges revealed a very broad agreement on the following points:

"Eureka will give rise to the launching of finalized programs drawn up in close consultation with industrialists, and making it possible to mobilize research workers and European enterprises on specific objectives that are ultimately likely to have commercial applications.

"The methods of implementing these programs will be decided individually in each case, with a concern for flexibility and effectiveness and with the aim of enabling everyone to adjust participation in accordance with interest and capabilities in the chosen sectors.

"At the same time it will be necessary to improve the conditions of European cooperation, especially with regard to the free circulation of high technology products and services.

"The useful and constructive suggestions which have been made lead me to think that the important thing in the coming months will be to stimulate the launching of finalized programs, to ensure their coordination, and to jointly pursue means of improving technological cooperation in Europe."

CSO: 3698/559

SCIENTIFIC AND INDUSTRIAL POLICY

R&D EXPENDITURES AT FRENCH NATIONALIZED FIRMS IN 1984

Paris AFP SCIENCES in French 10 Jan 85 pp 1-6

[Article: "Research and Scientific Employment in National Firms"]

[Excerpts] On 9 January Hubert Curien, minister of research and technology, emphasized in a report to the council of ministers that research and development in nationalized firms totaled 25 billion francs in 1984, over one-quarter of French research.

Here is the passage from the council of ministers' official statement regarding Curien's report:

"1. Public industrial firms make a particularly sizable contribution to research and thereby play a prime role in preparing France's industrial future:

- They employ over 75,000 people in the area of research, including over 20,000 researchers, and they allot more than 25 billion francs to research and development each year.

- The ratio of researchers to employees is three times greater in public firms than in the rest of French industry.

- During the 2 years 1982 and 1983 over 3,000 new researchers were hired by national firms.

- Since 1981 the financing of research in national firms has increased even more rapidly than that of private firms (in constant francs 6 percent per year on average in national firms and 2 percent in private firms).

- Researchers have been appointed to the administrative boards of public industrial firms either as qualified individuals or as government representatives.

2. The effort that has been started must be increased.

With this in mind, the government has adopted the objectives given below for industrial research in national firms.

These objectives will be implemented by updating planning contracts.

- Reemphasis on increasing research in firms, both in terms of volume and efficiency.

- Expanded exchanges with the research done in public research institutes.

- Training that is better adapted to the quantitative and qualitative needs of industrial research.

- Development of social research and inclusion of these results in the operation of companies.

- Development of joint research.

- Fertilizing industry through technologies developed in large businesses (setting up small specialized groups, subcontracting, forging links between big business and small businesses)."

FIRMS WITH R&D DEPARTMENTS AND WHICH ARE

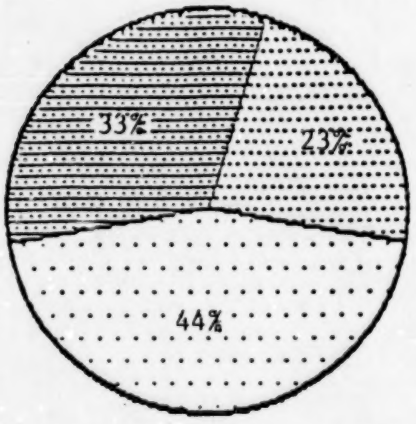
MAJORITY STATE CONTROLLED

AIR FRANCE
AEROSPATIALE
BULL
FRENCH COAL BOARD
CDF CHIMIE
AEC INDUSTRY
CGCT [GENERAL TELEPHONE CONSTRUCTION COMPANY]
CGE [FRENCH GENERAL ELECTRIC COMPANY]
DASSAULT
EDF [FRENCH ELECTRIC COMPANY]
EMC [MINING AND CHEMICAL ENTERPRISE]
GDF [FRENCH GAS COMPANY]
MATRA
USINOR
PECHINEY
RATP [INDEPENDENT PARISIAN TRANSPORT SYSTEM]
RENAULT
RHONE POULENC
SACILOR
SAINT GOBAIN
SEITA
SNCF [FRENCH NATIONAL RAILROADS]
SNEA [ELF AQUITAINE COMPANY]
SNECMA [NATIONAL AIRCRAFT ENGINE STUDY AND MANUFACTURING COMPANY]
SEP [EUROPEAN PROPELLANT COMPANY]
SNPE [NATIONAL POWDER AND EXPLOSIVES COMPANY]
THOMSON

TOTAL RESEARCH PERFORMED IN FRANCE IN 1984

95 billion francs (net of tax)

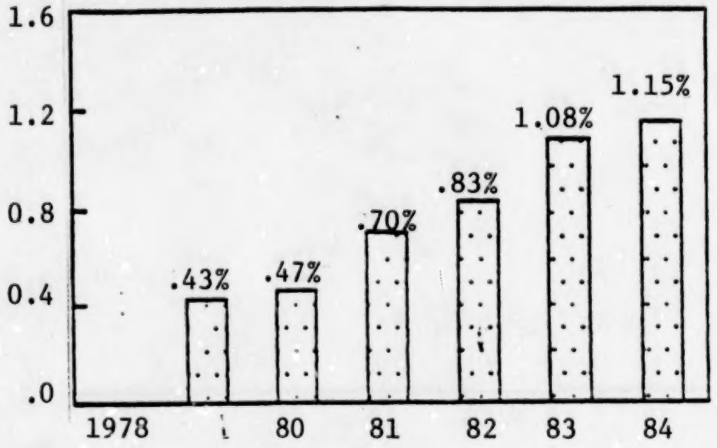
NATIONAL FIRMS



PRIVATE FIRMS

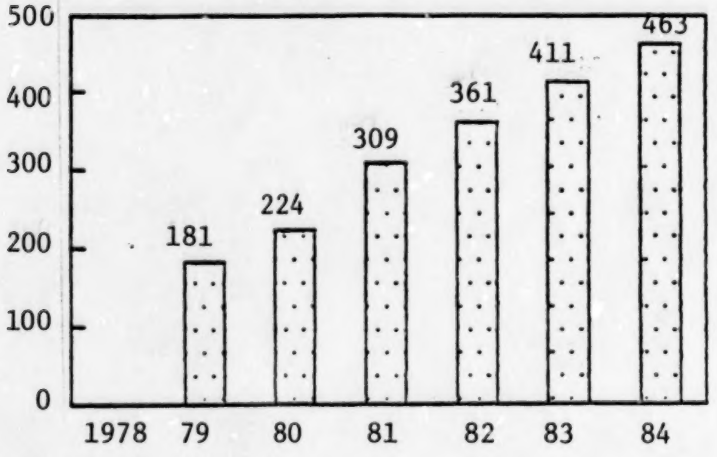
PUBLIC LABORATORIES AND INSTITUTIONS
(civilian and military)

R&D IN NATIONAL FIRMS IN THE IRON AND STEEL INDUSTRY AS A PERCENTAGE OF TURNOVER



R&D IN NATIONAL FIRMS IN THE IRON AND STEEL INDUSTRY

(R&D Expenditures in millions of constant 1984 francs)



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9 AUG 1985